

ABSTRACT

Three-dimensional tissue-like organization of cells by high cell-seeding-density culture termed as macromass culture is described. By macromass culture, cells can be made to organize themselves into a tissue-like form without the aid of a scaffold and three-dimensional macroscopic tissue-like constructs can be made wholly from cells. Tissue-like organization and macroscopic tissue-like constructs can be generated from fibroblastic cells of mesenchymal origin (at least), which can be either differentiated cells or multipotent adult stem cells. In this work, tissue-like organization and macroscopic tissue-like constructs have been generated from dermal fibroblasts, adipose stromal cells-derived osteogenic cells, chondrocytes, and from osteoblasts. The factor causing macroscopic tissue formation is large scale culture at high cell seeding density per unit area or three-dimensional space, that is, macromass culture done on a large scale. No scaffold or extraneous matrix is used for tissue generation, the tissues are of completely cellular origin. No other agents (except high cell-seeding-density) that aid in tissue formation such as tissue-inducing chemicals, tissue-inducing growth factors, substratum with special properties, rotational culture, etc, are employed for tissue formation. These tissue-like masses have the potential for use as tissue replacements in the human body. Tissue-like organization by high cell-seeding-density macromass culture can also be generated at the microscopic level.